Bachelor of Vocation (Radiology & Medical Imaging Technology)

B.Voc. (RMIT) Syllabus

I Semester				
S. No.	**Course Code**	**Subject**	**Content Type**	**Credit**
1	BVRMIT-101	General Human Anatomy & Physiology	General	4
2	BVRMIT-102	Fundamentals of Radiology and Imaging	Skill	4
3	BVRMIT-103	Orientation in Para clinical science	Skill	4
4	BVRMIT-104	Medical Ethics and Patients Care	General	3
5	BVRMIT-105	**Fundamentals of computer**	General	3
6	BVRMIT-106	**General English**	General	2
7	BVRMIT-107	**Personal Grooming**	General	3
	BVRMITP-1	**Vocational Practical**	**Skill**	**13**

BVRMIT -101 Fundamental of Human Anatomy & Physiology-1

UNIT-1

Anatomy : Introduction to human body , definition of anatomy, planes, position and movement of human body, anatomy of head and neck, cranial cavity, mouth pharynx, nose, pectoral region, shoulder, scapular region, upper and lower limbs ,bones and joints, pericardium and heart, lungs , diaphragm, trachea,esophagus, thoracic duct, brief introduction of skeletal system, organization of skeleton, definition, classification, constituents of bones and bone tissue, growth and development of bones, bones of cranium,electronic microscopic structure of cell,Structure of arteries, veins and capillaries

UNIT-2

Anatomy:Tissue- classification, functions and structure of primary tissues – epithelial tissue, connective tissue, muscular tissue, nervous tissue, function of arteries, veins and capillaries, cardiac cycle and heart sound, factors affecting heart rate and its regulation, physiological variations, factors controlling blood pressure, hemorrhage and shock, disease related to cardiovascular system, definition and classification of muscular tissue, characterization of skeletal, smooth, cardiac muscles, types of cartilage, skeletal, smooth and cardiac muscle.

UNIT-3

Physiology: introduction on physiology, cell-description of cell and its components, functions of cell, homeostasis, basics about different organs and systems, structure and functions of urinary system, organs of urinary system, glomerular filtration, physiology of urine formation, functions of kidney, glomerular filtration rate.

UNIT-4

Physiology: Introduction to blood and its components, functions of RBCs, WBCs and platelets, difference between serum and plasma components and organs of lymphatic system, introduction to reproductive system, structure and functions of male and female reproductive organs, parts of male and female reproductive organs.

BVRMIT -102 (FUNDAMENTALS OF RADIOLOGY AND IMAGING)

UNIT- 1

Atomic and nuclear structure (protons, neutrons, electrons), Atomic number, atomic masses, nuclides and isotopes, early atomic models, the hydrogen spectra, difficulties with Rutherford's model, Bohr's model, limitations of Bohr's model, the wave function of an electron, Quantum mechanics of hydrogen atom, Quantum numbers, Pauli exclusion principle, periodic table of element.Introduction, Maxwell's equation, electromagnetic waves, energy density and intensity, momentum, electromagnetic spectrum and radiation in Atmosphere, Fundamental and derived quantity, SI unit, various physical/radiation quantity used in diagnostic radiology and its unit (for example, KvP, mA, mAS, Heat unit (HU), Radiation exposure, Absorbed dose, Equivalent dose, etc.). Measurements, significant figures/digits in calculation, uncertainty in measurement, Propagation of errors, kinetic and potential energy, conservation of energy, work done by constant forces, work done by variable forces. Elastic and inelastic collisions.

UNIT -2

X-Ray tube : historical aspects, construction of X-Ray tubes, requirements for X-Ray production (electron source, target and anode material), tube voltage, current, space charge, early X-Ray tubes (coolidge tubes, tube envelop and housing) cathode assembly, X-Ray production efficiency, advances in X-Ray tubes, anode angulation and rotating tubes. Common factors affecting thermionic emission, specialized types (metallic, biangular, fluoro, CT) grid controlled and high speed tubes, focal spot size, speed of anode rotation, target angle, inherent filtration, radiation leakage and scattered radiation). Interlocking and X-Ray tube overload protection. Heat dissipation methods, tube rating, heat units, operating conditions, maintenance and Q.A procedures.

UNIT -3

X-Ray films and film processing ,Image characteristics , Interaction of ionising radiation with matter , Detection of ionising radiation . Dosimetry , Biological effects of ionising radiation , Radiation protection (related to Phase-II topics) , Biological effects of non-ionizing radiation , Quality assurance , Presentation and viewing of radiographs , Basic Mammography , Xeroradiography, Introduction of Dental Radiography. Interaction of ionizing radiation with matter . Types of interactions of X- and gamma radiation, Photoelectric & Compton, Bremsstrahlung, pair production, annihilation radiation..Exponential attenuation (linear/mass attenuation coefficients), Half ValueThickness (HVT), Tenth Value Thickness (TVT), dependence on energy and atomic number.. Radiation intensity and exposure, photon flux and energy flux density. . LET, range of energy relationship for alpha, beta particles and X-Rays,Characteristics X-Rays, factors affecting X-Ray emission spectra, X-Ray quality and quantity, HVL measurements, heel effect, soft and hard X-Rays, added and inherent filtration, reflection and transmission targets

UNIT -4

Filament current and voltage, X-Ray circuits (primary circuit, auto transformer), types of exposure switch and timers, principle of automatic exposure control (AEC) and practical operation, filament circuit, high voltage circuits, half wave, full wave rectification, three phase circuits. Types of generators**,** 3 phase, 6 and 12 pulse circuits, falling load generators, capacitors discharge and grid control systems.Types of generators, 3 phase, 6 and 12 pulse circuits, falling load generators, capacitors discharge and grid control systems.

BVRMIT-103 ORIENTATION IN PARACLINIC SCIENCE

UNIT-1

PARASITOLOGY

Entamoeba Histolytica ,Leishmania , Material Parasites of man ,Helminthology TaeniaSaginata , TaeniaSoleum , Echinococcusgranulosus , AscarisLumbricoidesAncylostomaduodenale ,Strongylidsstercoralis

UNIT-2

MICROBIOLOGY

Morphology & Physiology of Bacteri , Staphylococcus, Streptococcus Mycobacterium tuberculosis, Spirochetes, Corny bacterium Diptheria.

UNIT-3

VIRUS 1

General Properties of Virus, Herpes virus, Polio virus, Hepatitis virus, Oncogenic virus , HIV

UNIT-4

PATHOLOGY

Inflammation,Neoplasia ,Osteomyelitis , Fractures , Osteoporosis , Rickets.

BVRMIT-104 MEDICAL ETHICS AND PATIENT CARE

UNIT 1

Medical ethics

Definition - Goal - Scope Introduction to Code of conduct Basic principles of medical ethics – Confidentiality Malpractice and negligence - Rational and irrational drug therapy

Autonomy and informed consent - Right of patients Care of the terminally ill- Euthanasia Organ transplantation, ethics and law

Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information – Unauthorizeddisclosure - retention of medical records - other various aspects. Professional Indemnity insurance policy Development of standardized protocol to avoid near miss or sentinel events Obtaining an informed consent

UNIT -2

Hospital structure and organization,Radiography as a profession - professionalism, projecting professional image, professional and personal qualities (both essential and desirable) of the radiographer, Communication and Relational Skills - development of appropriate communication skills with patients, verbal and non-verbal communication, appearance and behaviour of the radiographer, Moving and lifting patients - hazards of lifting and manoeuvring patients, rules for correct lifting, transfer from chair or trolley

to couch and vice-versa, safety of both “Lifter” and “the Lifted” must be emphasised. Highlight on handling of geriatric, paediatric and trauma patients.

UNIT -3

Communicable diseases (special reference to AIDS), cross infection and prevention, patient hygiene, personal hygiene, departmental hygiene, handling of infectious patients in the department, application of asepsis, inflammation and infection processes,Patient vital signs - temperature, pulse, respiration and blood pressure - normal values and methods of taking and recording them, Medico-legal considerations - radiographers clinical and ethical responsibilities, misconduct and malpractice ; handling female patients, practic in pregnancy.

UNIT-4

Radiological contrast media - classification, need for radiological contrast media, methods of administration, dosage, reactions to contrast media, role of the imaging department and the radiographer in management of patient with contrast reaction.Basics of emergency care and life support skills Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag-valve-masks (BVMs),Choking, rescue breathing methods,One- and Tworescuer CPR, Using an AED (Automated external defibrillator),Managing an emergency including moving a patient

BVRMIT -105-Fundamental of Computers

Unit-1

Introduction to Computers

History of Computer , Generations, Characteristics, Advantages and limitations of

Computer,Classification of Computers, Functional Components of Computer, Imput ,Output and

Processing, Concept of Hardware and Software, Data & Information .Concept of data storage .

Number system. Decimal, Binary, Hexadecimal ASCII .

UNIT-2

Introduction to GUI Based Operating System

Basics of Operating system , Basics of DOS & LINUX, The User interface, File and directory

management, Windows setting, Control Panel, devices and Printer setting, Using various

window commands for desktop.

UNIT-3

Word Processing

Word processing basics, Menu Bar, Opening and closing documents ,save & save as , Page

setup ,print preview, and printing. Text creation and manipulation Editing, cut copy paste.

Document creation ,editing, Formatting the text – Paragraph indenting, bullets and numbering

,changing case, Table manipulation – creation of table ,insertion and deletion of cell, row and

column.

UNIT-4

Network basics , Internet

Basics of computer network LAN, WAN etc, Concept of Internet ,Basic of Internet Achitecture,

Services on Internet Architecture, World wide web and websites, Communication on Internet ,

Internet Services, Preparing Computer for Internet Access, ISPs and Examples ,Internet Access

Technologies. Web Browsing , Configuring web browser, Popular search engines Downloading

and printing web pages.

Internet application

Basics of E-mail , E-mail addressing , forwarding and searching, Composing

BVRMIT-106-GENERAL ENGLISH AND SOFT SKILL

Introduction to English language

a) Role and significance of English language in the present scenario

b) English language: its relevance for the Indian industry.

c) Introduction to listening, speaking, reading, writing and bench marking of

the class.

Functional Grammar

a) Parts of speech, articles, tenses, verbs and modals.

b) Practice of daily use words, numerals and tongue twisters

c) Vocabulary building, construction of simple sentences: Basic sentence pattern, subject and predicate.

d) Sentence construction – simple, complex and compound

English communication- About myself

a) Let's talk, making conversation, meeting and greeting

b) Introduction myself, my family and my friends

c) My opinions, my likes and dislikes

d) Life at collage, hostel and workplace

PRACTICALS

BVRMITP-101.PRACTICAL ANATOMY AND PHYSIOLOGY

Human anatomy (practical)

Demonstration of

- Study of Human Skeleton parts with skeletal models.
- Study with charts and models of all organ systems mentioned above.
- Microscopic slides examination of elementary human tissues, cells.
- Major organs through models and permanent slides.
- Parts of circulatory system from models.
- Parts of respiratory system from models.
- Digestive system from models.
- Excretory system from models.

Human Physiology (Practical)

- To measure pulse rate
- To measure blood pressure
- To measure temperature
- Measurement of the Vital capacity
- Determination of blood groups
- Transport of food through esophagus
- Calculation and evaluation of daily energy and nutrient intake.
- Measurement of basal metabolic rate
- Demonstration of ECG
- Bile juice secretion and execration 11. Urine formation and execration

BVRMITP-102.Practical Fundamentals of Radiology and Imaging

Practical

- X-ray tubes general features and mobile equipment's.
- Care and maintenance of X-ray equipment and image intensifier
- To study effects of Kilo Voltage Peak (KVP) and Milli Ampere Second (MAS)
- Congruence of Radiation and optical field and beam.
- Determination of focal spot size of diagnostic X-ray tube.
- KV and exposure time testing.
- Linearity testing of the timer.
- Consistency of mA loading.
- Consistency of Radiation output.

- Evaluation of total filtration of the tube.
- Table top exposure rate measurement in fluoroscopy.
- Demonstration of basic procedures with all radiographic equipment.

BVRMITP-103. Practical Orientation in Para clinical science

- Know the diagnostic techniques used in pathology
- Know the various categories of the causes of diseases
- Know the course, outcome, consequences of diseases
- Compound Microscope
- Dark ground Microscopy
- Measurement of Microorganisms
- Hanging drop Preparation
- Isolation of Pure Cultures
- Bacterial Staining
- Simple Staining
- Gram's Staining
- Acid Fast Staining
- Albert's Staining
- Capsule Staining
- Spore Staining
- Negative Staining

BVRMITP-104. Practical Medical Ethics and Patients Care

- law and liability and duties of staff
- Workplace issues
- Bioethical issue
- Care and handling of patient
- Medico legal cases
- emergency care and life support skills
- CPR
- Vital signs and primary assessment
- bag-valve-masks

BVRMITP-105- PRACTICAL FUNDAMENTALS OF COMPUTER

- Starting MS WORD, Creating and formatting a document,
- Changing fonts and point size,
- Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting

- objects, Page setup, Page Preview, Printing a document, Mail Merge.
- Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text
- wrapping , Sorting data, Auto Sum, Use of functions, referencing formula cells in other
- formulae , Naming cells, Generating graphs, Worksheet data and charts with WORD, Creating
- Hyperlink to a WORD document , Page set up, Print Preview, Printing Worksheets.
- Starting MS–Power Point,, Creating a presentation using auto content Wizard, Blank
- Presentation, creating, saving and printing a presentation, Adding a slide to presentation,
- Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word
- art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing
- note pages, preparing audience handouts, printing presentation documents, MS-Access, Creating tables and database, Internet, Use of Internet (Mailing, Browsing, Surfing).